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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/381,295	09/22/1999	SHIGERU AIHARA	0057-2521-0P	3791

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EXAMINER
DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
1745	27

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/381,295	Aihara
Examiner	**Art Unit**
Tracy Dove	1745

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jan 15, 2003*.

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-3, 5-15, 17, and 19* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) *8* is/are allowed.

6) ☒ Claim(s) *1-3, 5-7, 9-15, 17, and 19* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This Office Action is in response to the communication filed on 1/15/03. Applicant's arguments have been considered, but are not persuasive. Claims 1-3, 5-7, 9-15, 17 and 19 remain rejected in view of the prior art. Claim 8 is allowed. Claims 4, 16 and 18 have been canceled.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/15/03 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5-7 and 9-15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al., US 6,287,720, as evidenced by Takeuchi et al., US 6,096,456.

Yamashita teaches a battery comprising a positive electrode, a negative electrode and a sole porous separator (adhesive layer) disposed between the positive electrode and the negative electrode. The three layer structure is disposed in a casing containing an electrolyte. The porous separator includes at least one insulating substance (filler). See abstract. Example 2 teaches a separator having insulating particles of alumina with an average particle diameter of 1.0 μm and a PVDF binder. The particles of alumina and particles of PVDF were mixed with each other to obtain a powder mixture. Then NMP was added to the mixture to obtain a slurry. The slurry may be applied to either or both electrodes and dried to obtain the separator. See col. 22, lines 1-36. See col. 23, lines 16-22 for disclosure of the organic electrolyte containing lithium ions of instant claim 2. Yamashita teaches it is preferred that the binder is used in an amount of from 1/500 to 5/3, more preferably from 1/500 to ½, most preferably from 1/500 to 1/5, in terms of the volume ratio of the binder to the particles of the at least one insulating substance (alumina). See col. 7, line 66-col. 8, line 4. Note alumina is preferred as the insulating substance, col. 7, lines 33-37. The possible insulating substances are disclosed in col. 6, line 58-col. 7, line 17. The cell of Yamashita can be used in the form of a spirally wound structure in which the unit cell is spirally wound so that the negative electrode of the wound unit cell is positioned on the side of the outer surface of each wind of the spirally wound structure, or in the form of a laminate structure in which a plurality of the unit cells are laminated so that each positive electrode is positioned opposite to a negative electrode through a separator. See col. 13, line 58-col. 14, line

9. The alumina may be a particle size of 5 nm (0.005 μm) to 1 μm, most preferably (col. 7, lines 47-51).

Yamashita does not explicitly teach the electrodes have an uneven surface or the adhesive layer is connected to the electrodes at a predetermined peel strength in a range of from 50 gf/cm to 85 gf/cm.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have known that the surfaces of the electrodes, when formed, are uneven. This is evidenced by Takeuchi which teaches the electrodes have holes, or are uneven (col. 25, lines 17-29). The background section of the instant specification teaches that electrodes have their surfaces smoothed by pressing but still have unevenness of several microns to form vacancies where a conventional separator and the electrodes are not in contact (bottom of page 3-top of page 4). Thus, the skilled artisan would have known that electrodes generally have an uneven surface.

Note that since the materials of the inventive separator of Yamashita (Example 2 teaches alumina and PVDF) and those of the instant invention (all the Examples in Table 2-4 teach alumina and PVDF) are the same, the separator material of Yamashita will also fill any space in an uneven electrode surface. Similarly, one of skill would expect the inventive separator of Yamashita to have a peel strength similar to that of the instant claims. Specifically, Yamashita teaches the same ratios of adhesive resin to filler material. Thus, one of skill in the art would have known that a similar peel strength between the adhesive layer/separator and electrodes of

Yamashita would be similar to the peel strength between the adhesive layer and electrodes of the claimed invention.

Response to Arguments

Applicant's arguments filed 6/3/02 have been fully considered but they are not persuasive.

TAKEUCHI

The prior art rejections in view of Takeuchi have been withdrawn. Takeuchi does not teach or suggest the claimed weight ratio of adhesive resin to filler of not less than 1/5 and not more than 2. Note claim 18 was incorporated into claim 1, claim 18 was not previously rejected in view of Takeuchi. See Final Rejection of 8/16/02.

YAMASHITA

Applicant argues Yamashita discloses a conventional battery using a heavy casing, instead of the inventive adhesive layer, to hold together the positive and negative electrodes. This argument is not convincing because the claims to not exclude a battery casing. Also, Yamashita discloses that the casing usable for the battery is not particularly limited. The casing may be a metal can, formed from a material having a laminate structure or formed from a resin film (col. 10, lines 21-26). Thus, Yamashita teaches many types of battery casings and is not limited to a "heavy casing" as asserted by Applicant. Further argued, although Yamashita discloses a binder in which a volume ratio of binder to insulating particles can be from 1/500 to 5/3, the Examples of Yamashita only teach a weight ratio of 100/5 (20). However, the disclosure of Yamashita is not limited to the specific examples. Yamashita discloses a volume ratio of

binder to insulating particles can be from 1/500 to 5/3, most preferably 1/500 to 1/5 (col. 8, lines 1-4).

Applicant argues Yamashita does not teach or suggest the recited peel strength of claim 1. Applicant provides evidence that a weight ratio of PVDF to alumina of not less than 1/5 and not more than 2 gives the peel strength values recited in claim 1. The evidence provided shows that weight ratios of PVDF to alumina outside of the claimed range do not result in the peel strength values of claim 1. However, the evidence provided in Table A (page 5 of the amendment) are not commensurate in scope with the instant claims. Specifically, claim 1 is not limited to a PVDF adhesive resin and an alumina filler. Furthermore, Yamashita teaches more than just the 20:1 ratio of PVDF to alumina used in Table A (Yamashita is not limited to the specific examples disclosed in the reference).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

January 26, 2003

Patrick Ryan
Supervisory Patent Examiner
Technology Center 17